

REMARKS/ARGUMENTS

Claims 1-3, 5, 6, 8-12, 14, 15 and 17-23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,813,943 to Fradeneck. Such rejection is respectfully traversed.

Fradeneck discloses a basic oxygen furnace 10 which includes a sensor lance or sub lance 16 that is separate and distinct from an oxygen treatment lance 13. The notion of a sensor lance that is separate from a metal making lance is well known in the art. Indeed, a two-lance arrangement and its inherent disadvantages are discussed at page 3 of Applicants' specification - and it is from such an arrangement that the present invention represents a significant and patentable departure.

Accordingly, in order to make it unmistakably clear that the present invention is directed to a single metal making lance which is capable of performing both metal treatment and sensing functions, each of independent claims 1 and 10 have been amended herein to state that the sensor feed tube is carried by the lance barrel. That is, the sensor feed tube is carried by a lance barrel having at least one nozzle for discharging at least one of gaseous and particulate metal treatment material into a metal making vessel. In this regard, the modest flow of gas which is discharged from the opening 16a of the sensor lance 16 of Fradeneck is employed merely to purge the lance and prevent ingress of slag and metal splash-back into the open end of the sensor lance (see Fradeneck at column 2, lines 59-66). Unlike

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the present invention, the gas flow from Fradeneck's sensor lance 16 is not used to treat metal in the furnace.

Consequently, since Fradeneck discloses nothing more than a conventional two-lance arrangement (treatment lance 13 and sensor lance 16) from which the presently amended claims are clearly structurally distinguished, withdrawal of the outstanding Section 102(b) rejection of claims 1-3, 5, 6, 8-12, 14, 15 and 17-23 is respectfully requested.

Claims 1, 2, 4-11 and 13-23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fradeneck in view of U.S. Patent No. 3,396,960 to Maatsch. Such rejection is respectfully traversed.

Applicants' arguments above respecting Fradeneck are hereby adopted and reasserted in their entirety.

The Maatsch patent fails to provide a proper link between Fradeneck and the invention recited in Applicants' claimed invention. Maatsch discloses a combined sensing and treatment lance for use in a metal making vessel. However, the lance includes a consumable probe that is disposed in the center of the nozzle that discharges a stream of oxygen gas from the lance. The probe is cooled by the depressurization of the oxygen as it is discharged from the lance. In stark contrast to the Maatsch device, the metal making lance assembly defined in each of independent claims 1 and 10 of the present application requires a sensor feed tube that is separate from and isolated from fluid communication with the at least one treatment

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material discharge nozzle of the lance. The sensor tube thus shields the claimed consumable sensors from the gaseous and/or metal treatment material discharged by the lance.

The practical significance of this unique construction is that the sensor feed tube greatly reduces sensor reading distortion caused by impingement of the flowing metal treatment material upon the sensor. To illustrate most clearly, the lance assembly shown by Maatsch would be especially ineffective in situations where one would attempt to use a thermal probe or sensor to measure the temperature of the bath or furnace vessel. That is because depressurizing oxygen flowing around a thermal sensor disposed within an oxygen discharge nozzle in the manner of the probe 6 taught by Maatsch would cool the probe, thereby necessarily resulting in distorted temperature readings being taken by the probe. As a result, no combination of the teachings of the Fradeneck and Maatsch patents can produce the invention set forth most broadly in Applicants independent claims 1 and 10. Withdrawal of the outstanding rejection of claims 1, 2, 4-11 and 13-23 under Section 103(a) as being unpatentable over Fradeneck in view of Maatsch is therefore respectfully requested.


In view of the foregoing, the instant application is believed to be in condition for allowance and, therefore, early issuance thereof is earnestly solicited.

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If the Examiner believes that a telephone interview would be beneficial to advance prosecution of the present application, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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